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Port Rate Management Configuration Guide



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Comments and questions about how the ... system software works are welcomed. Please review the FAQ in the related manual, and if your question is not covered, send email by using the following web page:

<http://www.raisecom.com/en/xcontactus/contactus.htm>.

If you have comments on the ... specification, instead of the web page above, please send comments to:

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We hope to hear from you!

CONTENTS

Chapter 1	System Overview	1
Overview		错误！未定义书签。
Function feature		错误！未定义书签。
Caption 2		错误！未定义书签。
Caption 3		错误！未定义书签。
Chapter 2	System Operation	错误！未定义书签。
Overview		错误！未定义书签。
System installation		错误！未定义书签。
System activation		错误！未定义书签。
Shutdown system		错误！未定义书签。
System Upgrade		错误！未定义书签。
System maintain		错误！未定义书签。
Chapter 3	System Security Management	错误！未定义书签。
Overview		错误！未定义书签。
User management		错误！未定义书签。
User group management		错误！未定义书签。
Management domain management		错误！未定义书签。
Operation log management		错误！未定义书签。
Influence on Device Configuratin Operations		错误！未定义书签。
Influence on operations		错误！未定义书签。
Chapter 4	System Overview	错误！未定义书签。
Appendix A	Abbreviation	错误！未定义书签。
Appendix B	FAQ	错误！未定义书签。
Index		错误！未定义书签。

Release Notes

Date of Release	Manual Version	Software Version	Revisions

Preface

About This Manual

This manual introduces primary functions of the configuration management software for RC series products.

Who Should Read This Manual

This manual is a valuable reference for sales and marketing staff, after service staff and telecommunication network designers. For those who want to have an overview of the features, applications, structure and specifications of ... device, this is also a recommended document.

Relevant Manuals

《Raisecom NView System User Manual》

《Raisecom Nview System Installation and Deployment Manual》

《... User Manual》

《... Commands Notebook》

Organization

This manual is an introduction of the main functions of ... EMS. To have a quick grasp of the using of the EMS of ... , please read this manual carefully. The manual is composed of the following chapters

Chapter 1 Overview

This chapter briefly introduces the basic function of ...

Chapter 2 Configuration Management

This chapter mainly introduces the central site configuration management function of the

Chapter 3 Performance Management

This chapter focuses on performance management function of

Chapter 4 Device Maintenance Management

This chapter introduces the device maintenance management function of

Appendix A Alarm Type

The alarm types supported by

Compliance

The RC series products developed by Raisecom are strictly complied with the following standards as well as ITU-T, IEEE, IETF and related standards from other international telecommunication standard organizations:

YD/T900-1997 SDH Equipment Technical Requirements - Clock

YD/T973-1998 SDH 155Mb/s and 622Mb/s Technical conditions of optical transmitter module and receiver module

YD/T1017-1999 Network node interface for the Synchronous Digital Hierarchy (SDH)

YD/T1022-1999 Requirement of synchronous digital hierarchy (SDH) equipment function

YD/T1078-2000 SDH Transmission Network Technique Requirements-Interworking of Network Protection Architectures

YD/T1111.1-2001 Technical Requirements of SDH Optical Transmitter/Optical Receiver Modules—2.488320 Gb/s Optical Receiver Modules

YD/T1111.2- 2001 Technical Requirements of SHD Optical Transmitter/Optical Receiver Modules—2.488320 Gb/s Optical Transmitter Modules

YD/T1179- 2002 Technical Specification of Ethernet over SDH

G.703 Physical/electrical characteristics of hierarchical digital interfaces

G.704 Synchronous frame structures used at 1544, 6312, 2048, 8448 and 44 736 kbit/s hierarchical levels

G.707 Network node interface for the synchronous digital hierarchy (SDH)

G.774 Synchronous digital hierarchy (SDH) - Management information model for the network element view

G.781 Synchronization layer functions

G.783 Characteristics of synchronous digital hierarchy (SDH) equipment functional blocks

G.784 Synchronous digital hierarchy (SDH) management

G.803 Architecture of transport networks based on the synchronous digital hierarchy (SDH)

G.813 Timing characteristics of SDH equipment slave clocks (SEC)

G.823 The control of jitter and wander within digital networks which are based on the 2048 kbit/s hierarchy

G.825 The control of jitter and wander within digital networks which are based on the synchronous digital hierarchy (SDH)

G.826 End-to-end error performance parameters and objectives for international, constant bit-rate digital paths and connections

G.828 Error performance parameters and objectives for international, constant bit-rate synchronous digital paths

G.829 Error performance events for SDH multiplex and regenerator sections

G.831 Management capabilities of transport networks based on the synchronous digital hierarchy (SDH)

G.841 Types and characteristics of SDH network protection architectures

G.842 Interworking of SDH network protection architectures

G.957 Optical interfaces for equipments and systems relating to the synchronous digital hierarchy

G.691 Optical interfaces for single channel STM-64 and other SDH systems with optical amplifiers

G.664 Optical safety procedures and requirements for optical transport systems

I.731 ATM Types and general characteristics of ATM equipment

I.732 ATM Functional characteristics of ATM equipment

IEEE 802.1Q Virtual Local Area Networks (LANs)

IEEE 802.1p Traffic Class Expediting and Dynamic Multicast Filtering

IEEE 802.3 CSMA/CD Access Method and Physical Layer Instruction

Chapter 1 Port Rate Limiting And Shaping Configuration

1.1 Port rate limiting and shaping principle

Line rate means rate limiting based on ports, which restricts the overall rate of the ports' receiving and sending messages. Line rate uses token bucket to control the rate. If some port of the facility is in rate limit, all the messages received or sent by the port need to be handled by token bucket. If there is enough token in token bucket, then messages can be received or sent, or it will be abandoned.

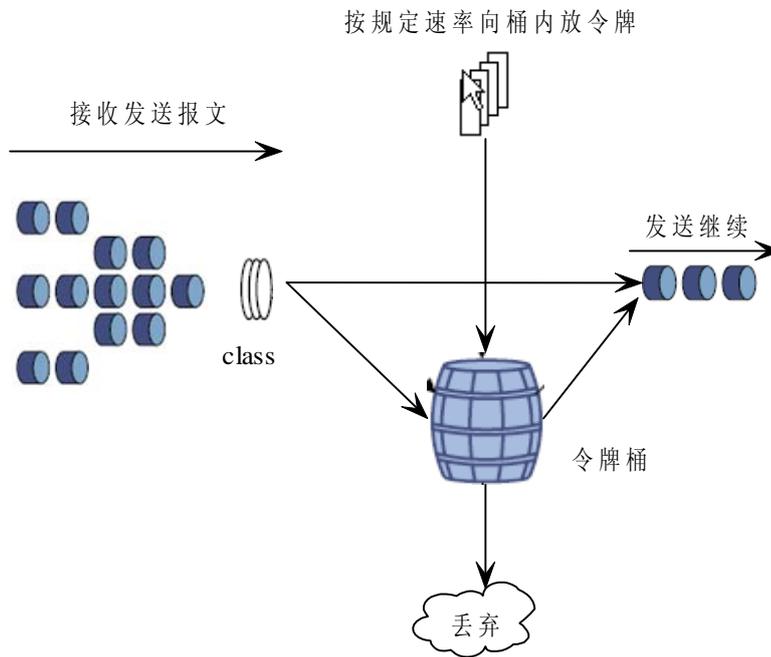


Figure 1 line rate process

Traffic shaping is used typically in confining the rate and limit of one stream in the output-network, so that this kind of message can be sent out steadily. Stream shaping is usually carried out by buffer and token bucket. When some groups' rate is too high, the message will be stored in buffer first, then it will be sent into the groups steadily.

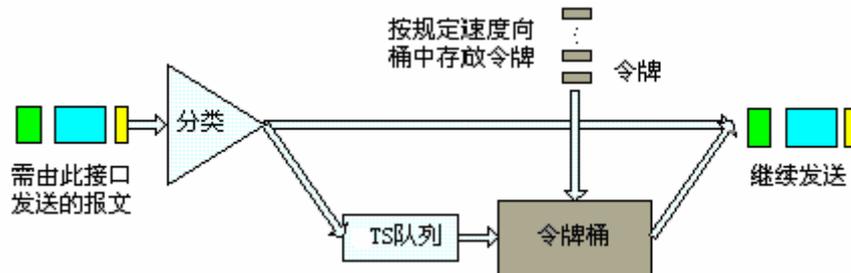


Figure 2 TS processing

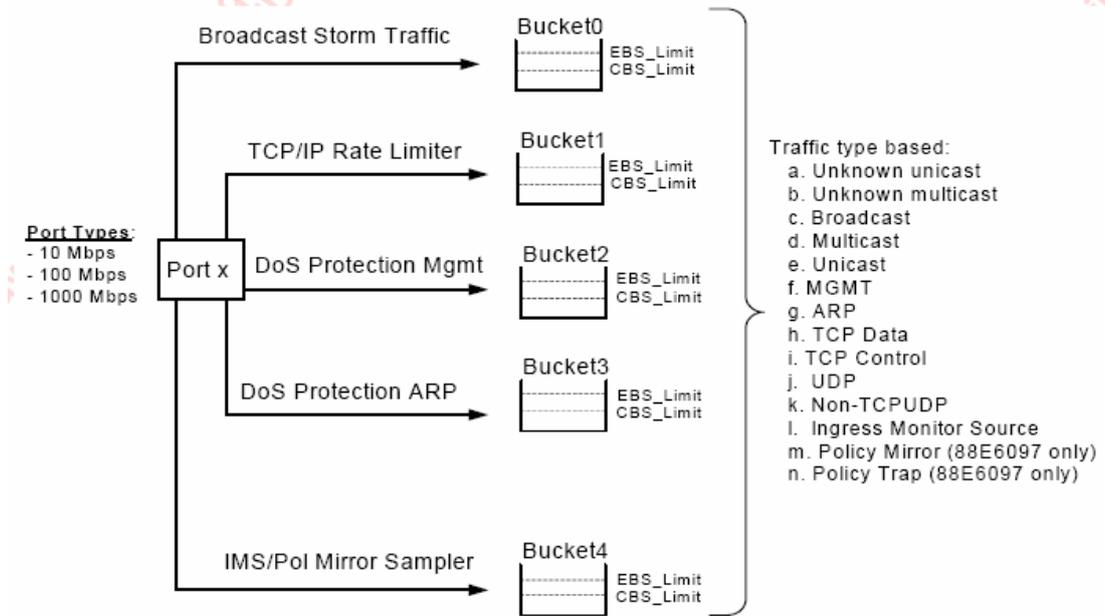
TS can reshape given group stream or all the groups. When the groups come, it is classified first, and then continue transmission if there is no need for TS and token bucket. If TS is needed, the group will be compared with the token in token bucket. The token bucket put token in the bucket according

to the rate that users set. If there is enough token for sending, the group will be sent, while the token number decreases according to the group length. When the token in the bucket is not enough for sending, the group will be stored in TS line. When there is group in the TS line, TS pick up one group and send it out periodically. Each sending will be compared with the token in the token bucket, until the token is not enough for the group in the line being sent out or all the groups in the line have been sent out.

For some purpose the bandwidth of the ports or VLAN needs to be confined. In this situation the bandwidth function needs to be configured that the port or VLAN bandwidth be confined in a range, the data that is over the bandwidth will be abandoned. By default, the ports and VLAN rate is auto negotiated, which need not to be confined.

The ingress port rate can be confined based on specified message and line priority. PIRL module uses speed confining resources to accomplish speed confining, aiming at the message type, message line privilege of the ingress port. Take MV6097 for example, this chip support 5 speed limitation resource every port, which is seized by global storm control, ports' message type and line privilege. Rate limitation is carried out by token bucket.

The model is as the following:



The speed limitation steps include: 64Kbps-1Mbps, the step is 64Kbps; 1Mbps-100Mbps, the step is 1Mbps; 100Mbps-1000Mbps, the step is 10Mbps.

Speed limitation aims at the following message type: ARP, TCP Data, TCP Ctrl, UDP, Non-TCPUDP, the line priority is 4. When the messages transmission speed exceeds the limit value, it can be abandoned or under traffic control.

1.2 Speed limitation and reshaping based on port function configuration

1.2.1 The default configuration

Function	Default value
The ingress port resource speed limitation message type, line	Or calculation relationship

priority calculation.	
When ingress port resource exceed the given speed limit	Drop drop
MAC no-speed limitation	Disabled
Port no-speed limitation function based on smac, dmac	Disabled

1.2.2 Port speed limitation and reshaping function

1. configure the ingress port bandwidth and burst:

Step	Command	Description
1	<code>config</code>	Enter global configuration mode
2	<code>rate-limit port-list {all port-list} ingress rate [burst]</code>	Set the physical port bandwidth limit <i>port-list</i> physical port, ranging from 1 to the maximum number, use ‘,’ and ‘-’ for multi-port input; <i>rate</i> means the bandwidth, the unit is kbps, from 1 to 1048576. <i>burst</i> the burst, unit Kbps, can be set from 1 to 512. The actual value may be different from the value setting; <i>ingress</i> the ingress direction
3	<code>exit</code>	Quit global configuration mode and enter EXEC privileged mode
4	<code>show rate-limit port-list [port-list]</code>	Show port bandwidth limitation. <i>port-list</i> is accord with the meaning above.

What’s special, the specified message and queue priority speed limitation can be set.

Step	Command	Description
1	<code>config</code>	Enter global configuration mode
2	<code>rate-limit port-list portlist ingress <1-1000000> queue-priority {1-4}</code>	Configure the port number, speed limitation value and message queue priority;

	[tcp-ctrl] [udp] [non-udptcp]	the range is 1 to max no.; use ‘,’ and ‘-’ to carry out multi-port input. 1-1000000: ingress port bandwidth, the unit is kbps; or: calculation type; and calculation type: the ingress message; arp:arp message; tcp-data:tcp-data message; tcp-ctr: tcp control message; udp: udp message; non-udptcp: includes IGMP, ICMP, GRE, IGRP, cisco, L2TP message;
6	exit	Return to EXEC privileged mode;
7	show interface port <i>port_id</i> rate-limit	Show PIRL configuration information <i>port_id</i> port ID

⚠ Notice:

- PIRL module confines the ingress port value in the following range: mega port <64-100000>kbps, giga port <64-100000>kbps; when the mega port configuration value exceeds 100000kbps, it will be set as 100000kbps. If there is no specified speed limitation message or message queue priority, all the messages will be limited. The configuration value might be different from the actual value, which is decided by the chip.

In PIRL module, when the speed limited message transmission speed exceeds the speed limitation, use **drop** and sending pause frame to handle it.

The configuration step is show as following:

Step	Command	Description
1	config	Enter global configuration mode;
2	interface port <1-MAX_PORT_NUM >	Enter ethernet physical port mode; MAX_PORT_NUM the maximum port number that the equipment support;
3	[no] rate-limit flow-control	Configure flow-control

		mode, by default it is drop mode ;
4	exit	Return to EXEC privileged mode
5	show interface port <i>port_id</i> rate-limit	Show PIRL configuration information; <i>port id</i> port number

In PIRL mode, the specified MAC speed no-limitation is available only to the messages that has already entered the switch; if it fits the static MAC configuration, then there will be no such message speed limitation.

The configuration step is show as following:

Step	Command	Description
1	config	Enter global configuration mode
2	mac-address-table static unicast <i>HHHH.HHHH.HHHH</i> vlan <i>vlan_id</i> port <i>port-number none-rate-limit</i>	Configure the static MAC no-speed limitation function; <i>HHHH.HHHH.HHHH</i> static MAC address; Vlan id: VLAN ID, the range is from 1 to 4094; <i>port-number</i> port number, the range is from 1 to the maximum port number;
3	exit	Return to EXEC privileged mode
4	show mac-address-table static	Show MAC strategy configuration.

Open/close no-speed limit function based on **smac, dmac**, the configuration step is show below:

Step	Command	Description
1	config	Enter global configuration mode
2	interface port<I-MAX_PORT_NUM >	Enter Ethernet

		physical port mode; <i>1-MAX_PORT_NUM</i> the port range that the equipment supports
3	[no] rate-limit {smac/dmac} none-rate-limit	Configure the no-speed limit function based on smac,dmac;
4	exit	Return to global configuration mode
5	show interface port <i>port_id</i> rate-limit	Show PIRL configuration information; <i>Port id</i> port ID

2 Configure the ingress port bandwidth and burst:

Step	Command	Description
1	config	Enter global configuration mode
2	rate-limit port-list {all <i>port-list</i>} egress <i>rate</i> [<i>burst</i>]	Configure the rate limiting. <i>port-list</i> physical port number, range is 1-26, use “,” and “-“ for multiple ports’ rate limiting. <i>rate</i> stands for the maximum bandwidth allowed to be transmitted, unit is kbps, range is 1-1048576. (The actual value may be a little bit different from the configured

port-list strands for physical port number, range is 1-26, use ',' and '-' for multi-port ingress

1.2.4 Typical configuration example

➤ Aim

Configure the uplink bandwidth of the sw1's port 1 as 1000kbps, burst 64kbps, port 2 fits message **arp** and speed limit at message priority level 1-2, the speed limit value is 1000Kbps, open port 2 traffic control mode, so that the switch could manage the network traffic.

➤ Network structure:

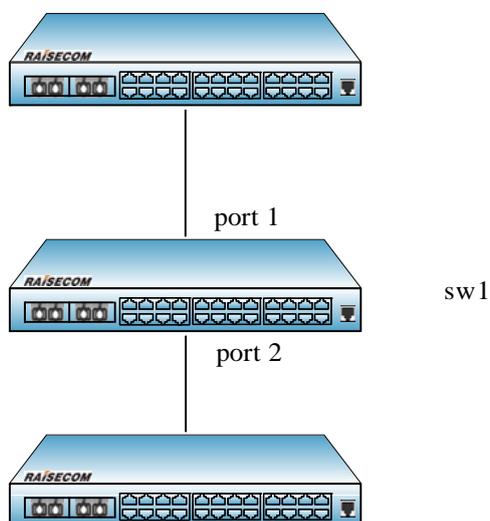


Figure 4 network structure

➤ Configuration step:

Step 1:

```
Raisecom#config
```

```
Raisecom(config)# rate-limit port-list 1 ingress 1000 64
```

Set successfully

Actual ingress rate of FE port: 1000

Actual ingress burst of FE port: 64

```
Raisecom(config)#exit
```

```
Raisecom# show rate-limit port-list 1
```

I-Rate: Ingress Rate

I-Burst: Ingress Burst

E-Rate: Egress Rate

E-Burst: Egress Burst

Port	I-Rate(Kbps)	I-Burst(KBps)	E-Rate(Kbps)	E-Burst(KBps)
1	1000	64	0	0

Step 2:

```
Raisecom(config)# rate-limit port-list 2 ingress 100 queue-priority 1-2 and arp
Set successfully
```

```
Raisecom(config)#interface port 2
Raisecom(config-port)# rate-limit flow-control
Set successfully
```

```
Raisecom#show interface port 2 rate-limit
port: 2
flow-control: Enable
smac-none-limit-rate: Disable
dmac-none-limit-rate: Disable
session CIR(kbps) BA(kBps) rate-limit-operation queue-priority traffic-type
-----
1 100 128 and 1 2 arp
```

1.3 Speed limitation and reshaping function based on VLAN configuration

1.3.1 The default configuration

By default, there is no bandwidth limit based on VLAN.

1.3.2 Speed limitation and reshaping function based on VLAN configuration

1 Configure speed limitation based on VLAN:

Step	Command	Description
1	config	Enter global configuration mode
2	rate-limit vlan <1-4094> <i>rate burst</i>	Set the traffic limitation based on VLAN. <1-4094> : VLANID; <i>Rate</i> strands for the bandwidth

		limitation based on VLAN, the unit is kbps, range is 1-1048576. The actual value may be different from the configured one.
		<i>burst</i> configured burst, the unit is Kbps,
3	exit	Exit from global configuration and enter EXEC privileged mode
4	show rate-limit vlan	Show the port speed limitation

2 configure the bandwidth and burst based on QinQ VLAN

Step	Command	Description
1	config	Enter global configuration mode
2	rate-limit double-tagging-vlan outer {<1-4094> any} inner {<1-4094> any} <i>rate burst</i>	Configure the bandwidth limit based on QinQ VLAN; outer {<1-4094> any} outer layer VLAN, <i>any</i> strands for any outer layer VLAN; inner {<1-4094> any} lining VLAN, <i>any</i> strands for any outer layer VLAN; <i>rate</i> strands for the configured bandwidth value, the unit is kbps, range is 1-1048576,the actual value may be different from the configured value. <i>burst</i> the configured burst, the unit is kbps, the value can be set from 1 to 512. The actual value may be different from the configured value.
3	exit	Exit from global configuration mode and enter EXEC privileged mode.
4	show rate-limit vlan	Show the port bandwidth limitation.

 Notice:

- The outer layer VLAN can not be un-assigned at the same time.

1.3.3 Monitoring and maintaining

Using **show**, the switch's VLAN speed limit configuration and state can be shown for the convenience of monitoring and maintaining. The related command is shown below:

Command	Description
show rate-limit vlan	Show the port bandwidth limitation.

1.3.4 Typical configuration example

➤ Aim

Set the switch's VLAN 5 bandwidth as 2048kbps, the burst is 128kbps;

Set the outer layer VLAN as 6, lining VLAN as 10, the bandwidth 1024kbps, the burst 64kbps, to accomplish VLAN management.

➤ Configuration step:

Step 1:

Raisecom#**config**

Raisecom(config)# **rate-limit vlan 5 2048 128**

Set successfully

Actual rate: 2048

Actual burs: 128

Step 2:

Raisecom(config)# **rate-limit double-tagging-vlan outer 6 inner 10 1024 64**

Set successfully

Actual rate: 1024

Actual burs: 64

Raisecom(config)#**exit**

Raisecom# **show rate-limit vlan**

CVLAN: Customer VLAN(inner VLAN)

SPVLAN:Service provider VLAN(outer VLAN)

Type	CVLAN	SPVLAN	Rate(Kbps)	Burst(KBps)
single	5	--	2048	128
double	10	6	1024	64



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